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ABSTRACT

The purpose of this study was to examine intellectual (standardized tests and high school grades) and nonintellectual (attitudes, personality, and the like) predictors of success for students in special programs for culturally different students. Ninety-five freshmen enrolled in a special program at the University of Maryland, 90 of whom were black, were included in the sample. The criterion variable was first semester freshman grade point average. Predictors included Scholastic Aptitude Test (SAT), high school grade point average, sex, father's occupation, mother's occupation, whether student has incomplete credit hours or not, instate or not, Internal-External Control, Holland Vocational Preference Inventory Infrequency, California Personality Inventory Communality, and a specially calculated Admissions Score involving a weighted combination of the above and other scores. Data were analyzed using multiple regression equations and zero order Pearson correlations by sex. The results showed that the SAT was not a significant correlate of college grades overall and the SAT-Math actually had a negative correlation with grades for males. Additionally, high school grades did not correlate with college grades for either males or females. On the other hand, reasonable predictions of freshman grades are possible using several nonintellectual predictors. (Author/JM)

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PREDICTORS OF ACADEMIC SUCCESS FOR UNIVERSITY STUDENTS IN SPECIAL PROGRAMS

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SUMMARY

While the issue of the cultural fairness of predictors used in college admissions has been hotly debated, there has often been more talk than actual research on the subject. It was the purpose of the present study to examine intellectual (standardized tests and high school grades) and nonintellectual (attitudes, personality, etc.) predictors of success for students in special programs for culturally different students. Ninety-five freshmen enrolled in a special program at the University of Maryland, 90 of whom were black, were included in the sample. Using first semester freshman grade point average as a criterion, data were analyzed using multiple regression equations and zero order Pearson correlations by sex. The results showed that the SAT was not a significant correlate of college grades overall and the SAT-Math actually had a *negative* correlation with grades for males (-.33). Additionally high school grades did not correlate with college grades for either males or females. On the other hand, reasonable predictions of freshman grades are possible using nonintellectual predictors such as completion of credit hours attempted and a positive reaction to external control. The writers feel that enough evidence exists for differences in variables relating to black student success as compared to other racial and cultural groups to consider that to ignore the evidence is to be guilty of unprofessional and indeed inhumane conduct.

The issue of the cultural fairness of predictors used in selecting students for admission to colleges and universities has been hotly debated in recent years. Unfortunately there has often been more talk than actual research on the subject. The studies that have been done can be generally categorized as dealing with either the appropriateness of commonly employed intellectual measures such as standardized test scores (e.g., ACT or SAT), and high school grades (HSGPA) or class rank (HSR) or less traditional nonintellectual measures such as motivation, personality and attitude variables.

The bulk of the evidence seems, at first glance, to point to the conclusion that test scores, and to some extent HSGPA or HSR, can be used with no apparent discrimination against cultural or racial minorities. For instance, Stanley in summarizing the work on predicting the success of what he calls "disadvantaged" students, has concluded that admission to selective colleges and universities should be based substantially on test scores and high school grades, irrespective of whether the applicant is from a minority racial, ethnic or socioeconomic group. Stanley feels pessimistic about the possibility of remediation for "disadvantaged" students and states (1971, p.642) "an admissions officer ignores test scores at his institution's peril." While there have been an increasing number of studies showing that the same predictors work about as well for blacks and whites (e.g., Thomas and Stanley, 1969; Bowers, 1970; Kallingall, 1971; Pfeifer and Sedlacek, 1971; Temp, 1971; Thomas, 1972), there also exist studies with contrary or unexplained findings (e.g., Clark and Plotkin, 1963; Green and Farquar, 1965; Cleary, 1968; Pfeifer and Sedlacek, 1971; Sampel and Seymour, 1971; Temp, 1971). Contrary findings include noting different optimal regression weights for race-sex groups (e.g., HSGPA and HSR commonly have been found to be poor predictors for black males), and underprediction or *overprediction* of actual grades achieved in college. The point that overprediction of black student grades using regression equations

may be indicative of irrelevance of a predictor has not been well discussed in the literature. Commonly, fairness has been viewed simply as whether blacks do as well or better than test scores indicate. However, if blacks do worse than predicted it may be a sign that we are forcing our predictors in an area where they don't completely or at all belong. In light of some of the studies cited above and later in this report, this may be a reasonable hypothesis to explore. It is the contention of the present writers and others that the broad issue is one of using appropriate predictors reflecting cultural experiences rather than researching or arguing over the exact nature of that inappropriateness. Several writers have addressed themselves to the complexities of defining cultural fairness (Linn and Werts, 1971; Thorndike, 1971).

Numerous researchers over the years have used nonintellectual predictors of student success in general (e.g., Holland, 1960; Goodstein and Heilbrun, 1962; Johnson, 1969) and recently evidence for nonintellectual correlates of black student success has been found. For instance, Epps (1969) found that among northern and southern black high school students self concept of ability and conformity had strong relationships with student grades. Thus blacks who were confident of their own ability and who did not need to conform to the behavior of others got the highest grades. DiCesare, Sedlacek and Brooks (1972) obtained related findings against an attrition criterion. They found that blacks who remained enrolled at the University of Maryland tended to have strong self concepts and were more realistic about the University as they adapted to it to achieve their goals. For instance, returning blacks had higher educational aspirations, felt more strongly that the University should influence social conditions and saw more racism at the University than did non-returning blacks.

Gurin, Gurin,Lao and Beattie (1969) did a study on external and internal variables that motivate blacks. They found that blacks who blamed themselves or

believed that "fate" was responsible for their disadvantaged status had fewer individual aspirations and were less concerned with collective attempts to change society than the externally motivated blacks who believed there were social barriers to black achievement. Pfeifer and Sedlacek (1973) found that some personality measures tended to work differentially, perhaps in opposite directions, for black and white students. For instance, they found that the Communality scale of the California Psychological Inventory (CPI) correlated significantly positively with grades for blacks and was not a significant predictor for whites. The Communality scale measures the degree to which an individual corresponds to the modal response pattern for the CPI. Pfeifer and Sedlacek (1970, 1973) also found that the Infrequency scale of the Holland Vocational Preference Inventory (VPI) correlated significantly positively for blacks and significantly negatively for whites. Since the Infrequency scale measures deviation from a common profile on the VPI they interpreted the result as indicating that blacks may look deviant on a personality measure simply because it was normed on another cultural group. Thus by expressing their culture, blacks look one way on the scale and whites by expressing their culture look the opposite way, and the scale is a valid predictor of academic success for each group but *in opposite directions*.

In an extensive summary of studies of nonintellective variables relating to the academic success of "minority/poverty" students conducted by Project Access (1972) a number of possible variables worth further study were identified. It was the purpose of the current study to examine the best of the potentially valid nonintellectual predictors on an independent sample of university students enrolled in special programs for culturally different students. Since many studies have focused on either intellectual or nonintellectual predictors, it was decided that in the present study both types of variables would be examined.

Method

A sample of 95 freshman students from seven classes were included in the study. The classes were special sections for students needing support in vocational and educational planning. All students were enrolled in a special program at the University of Maryland and all but five of the students were black. The criterion variable was first semester freshman grade point average (FGPA). Predictors included SAT-Verbal and Math, HSGPA, sex, father's occupation, mother's occupation, whether student has incomplete credit hours or not, instate or not, attended summer school or not, Internal-External Control, VPI Infrequency, CPI Communality and a specially calculated Admissions Score involving a weighted combination of many of the above and other scores. The Admissions Score is being used by the University on an experimental basis to admit 104 freshmen in fall 1972. The Appendix contains a description of all variables in the study.

Data were analyzed using multiple regression equations and zero order Pearson correlations. Separate analyses were done by sex, eliminating SAT, and then eliminating both SAT and HSA from the regression equations after an overall analysis was done. Data were analyzed by sex because of its importance in past studies and SAT and HSA were eliminated from some regression analyses to see how well non-intellectual variables alone were able to predict FGPA.

Results

Table 1 shows means, standard deviations and zero order Pearson correlations of each predictor with FGPA by sex and total groups. Table 2 shows regression equations, multiple correlations (R's) and standard errors of estimate by sex and total groups.

The zero order correlations for the total sample show that Academic Objectives Met had the largest significant correlation with FGPA (.66) followed by Race of Teacher (-.28), Control Ideology (.24), and Internal External Control Total Score (.21). The significant zero order correlations with FGPA for females were Academic Objectives Met (.59), SAT-Verbal (.56), and Race of Teacher (-.38). The significant zero order correlations with FGPA for males were Academic Objectives Met (.66), CPI Communality Weighted Score (-.34), SAT-Math (-.33), Internal-External Control Total Score (.33), and Control Ideology (.30).

The regression equations show that the most consistent positive predictor for all groups is Academic Objectives Met. Other positive predictors include Personal Control, Internal-External Control Total Score and SAT-Verbal. Negative predictors include Father's Occupation, CPI Communality, Maryland Standard Score and Weighted Score, and System Modifiability.

Discussion

A number of interesting and perhaps unexpected results deserve further discussion. The pattern of correlations and regression weights involving the SAT are particularly interesting. Overall the SAT-Verbal and Math did not significantly correlate with FGPA, although they both carried weight in the regression equation. This finding is contrary to most of the previous work on the usefulness of the SAT in academic prediction. Several explanations for this finding are possible. Students were chosen for enrollment in the special program substantially on the basis of looking poor on traditional predictors but showing the potential to succeed in other ways. Thus in a sense the students in the study were systematically chosen to generate little or no relationships between FGPA and traditional predictors. Another possible explanation for the small

relationships between SAT and FGPA is that since SAT scores were only available for 41 students, there may have been some self selection in who happened to take the SAT and report scores to the University. Thus, the 41 students may not be representative of all those in the program. In addition the total sample (N=95) in the study only represented about half the students enrolled in the program. Those attending the session where the data were gathered are not likely a random sample of all students in the program, although there was no information given to the students prior to the session other than it was regularly scheduled and they were expected to be there.

If one additionally notes that SAT-Verbal correlated .56 with FGPA for females and -.03 for males while SAT-Math correlated .16 for females and -.33 for males, the conclusion that the SAT tended to work in opposite directions on each scale for males and females with the relationship being masked or cancelled out when the sexes are combined, seems plausible. While there are potential sampling and statistical artifacts which may explain the results, it appears that a traditional use of SAT scores with this sample would have been reasonable for females but would have resulted in *negative* validity for males. That is the worst males, not the best would have been chosen.

High school grades did not correlate significantly with college grades for either males or females. Previous research has indicated that high school grades are a consistently poor predictor for black males (Pfeifer and Sedlacek, 1971). Several studies have shown that most students in special programs at large universities are still being chosen with standardized tests and high school grades (Sedlacek and Brooks, 1970; Sedlacek, Brooks and Horowitz, 1972; Sedlacek, Brooks and Mindus, 1973). While the findings of this study certainly must be replicated before any general conclusions are made, a strong caution should be

made against such use without a thorough local examination of the validity of such a procedure.

The finding that those students with fewer incomplete credit hours in college get higher grades is interesting from several viewpoints. First, it is not a predictor in the sense that it is information available before a student begins college. However, it may be a particularly valuable tool for the college counselor or personnel worker working with students in special programs. Incomplete hours is a behavioral indicator which certainly deserves further exploration in future research. Intuitively it would seem that incomplete hours is an index of motivation. It could be that completion of hours is an example of the kind of index that shows success in an area not usually examined but useful as an indicator of academic success. Thus, setting and accomplishing goals prior to college, not necessarily academic goals, may be a key variable largely unexplored in admissions research (see Sedlacek, 1973).

Two Internal-External Control (I.E.) scales (Control Ideology and Total Score) correlated significantly with FGPA. These findings appear logical in that most special programs, including the one at Maryland, involve more structure and externally imposed control over students than is applicable to students not in a special program. These results suggest that those students who respond positively to the program controls placed on them achieve higher grades. Another possible interpretation of the I.E. scale results is that students achieve better grades if they recognize that their special program, the University and the larger society do affect and control their lives, and perhaps not always in a positive way. For instance, DiCesare, Sedlacek and Brooks (1972) found that blacks who expected and were prepared to face, the racism they encountered at the University were more likely to stay in school than those blacks unprepared for it. As the term institutional racism is receiving more attention in recent years, it could be that the I.E. scale provides us with one way to further define and examine this phenomenon.

Race of Teacher correlated significantly (-.28) with FGPA and was consistent for males and females. The direction of the correlation indicates that those students with black teachers in their primary course in the program were more likely to achieve lower grades than students with teachers of another race. Since there were seven different teachers whose students were in the study and the study did not control for any effects or variables related to teacher performance, the reasons for the direction of the correlation are most tenuous. However, it does lead to some speculation that characteristics of teachers in special programs, including race, is an area of research which deserves considerably more work. It is likely that many characteristics of teachers other than race may relate to how well their students do in school.

Only one of the CPI Communality or VPI Infrequency scores was significantly related to FGPA: a specially calculated weighted score of CPI Communality for males (-.34). These findings are not easily explained since past studies have found positive relationships between these two scales and FGPA for blacks in general. It could be that the particular sample used in this study is quite unique, or it could also be that not enough research has been conducted which adequately differentiates between blacks in special programs and black students in general. Few studies give detailed information on the black samples employed.

Other variables not related to FGPA included an experimental admissions score, in-state residence and attendance of summer school. Further evidence for the usefulness of these variables should be provided before they are seriously considered as predictors. A predictive validation study using the experimental admissions score is currently underway at the University of Maryland.

A possible methodological problem in the study is the danger of making a Type I error due to the number of significance tests conducted. This is perhaps compounded by the small number of subjects in some samples and the relatively large number of predictor variables examined. However, the results tended to be

quite internally consistent and stable across the analyses. The multiple correlations held up well under cross validation or validation with an opposite sex sample (see Table 2). Also, Table 1 shows 12 correlations significant out of 85 conducted. Sakoda, Cohen and Beall (1954) would predict only about 8 or 9 to be significant due to chance at the .05 level. Thus, there is some evidence to consider the results as worthy of exploration and interpretation.

Overall, this study suggests that while traditional academic predictors such as SAT may be useful indicators of success of students in special programs, they may have negative validity and predict in a direction opposite to what is expected. On the other hand, reasonable predictions of FGPA can be made using nonacademic predictors such as completion of hours attempted and reaction to external control. Continuing research into the prediction of success of minority students in higher education appears justified and desirable. While the sample in the current study may have had some idiosyncrasies, a central object of research on cultural and racial fairness in testing and admissions procedures is to insure that groups and individuals do not get abused simply because they are small in number or power. How many other groups are similar to the current sample is an empirical question but it is likely there are some if not many. The importance of each institution conducting its own research cannot be overstressed. It is also likely that instruments such as the SAT can be used efficiently and the best predictions *on the average* could be obtained. But a society and an educational community which is culturally and racially pluralistic must provide for this diversity in its decision making. The writers feel that enough evidence already exists for differences in the variables relating to black student success as compared to other racial and cultural groups to consider that to ignore the evidence is to be guilty of unprofessional and indeed inhumane conduct.

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TABLE 1

Zero Order Pearson Correlations of Predictors and Freshman GPA
with Means and Standard Deviations

NO.	PREDICTOR	FEMALE (*N*=36) MEAN	S.D.	*r*	MALE (*N*=59) MEAN	S.D.	*r*	TOTAL (*N*=95) MEAN	S.D.	*r*
1	Sex	2.00	0.00	.00	1.00	0.00	.00	1.38	0.49	-.06
2	Father's Occupation	8.31	2.99	-.18	8.85	2.35	-.15	8.64	2.61	-.16
3	Mother's Occupation	7.39	2.85	-.10	7.80	3.08	-.09	7.64	2.99	-.09
	VPI INFREQUENCY									
4	Raw Score	5.89	3.93	-.09	3.95	3.72	.05	4.68	3.90	-.02
5	Maryland Standard Score	50.36	10.09	-.13	49.81	11.17	.04	50.02	10.72	-.02
6	National Standard Score	46.44	34.27	-.10	35.83	35.67	.08	39.85	35.34	.01
7	Weighted Score	0.47	0.51	-.29	0.34	0.48	-.08	0.39	0.49	-.17
	CPI COMMUNALITY									
8	Raw Score	13.42	2.06	-.10	13.51	2.92	-.20	13.47	2.62	-.17
9	Maryland Standard Score	51.56	7.28	-.10	50.78	9.89	-.21	51.07	8.96	-.17
10	National Standard Score	1.39	3.42	.25	2.85	5.42	-.09	2.29	4.80	.01
11	Weighted Score	0.11	0.32	-.05	0.03	0.18	-.34*	0.06	0.24	-.19
12	Admissions Score	50.42	7.96	.07	50.71	10.07	.06	50.60	9.28	.06
	INTERNAL-EXTERNAL CONTROL									
13	Control Ideology (39 items)	6.81	2.58	.16	6.54	2.49	.30*	6.64	2.51	.24*
14	Personal Control (39 items)	2.75	1.27	-.04	2.10	1.40	.21	2.35	1.38	.10
15	System Modifiability (39 items)	2.78	1.17	-.29	2.42	1.22	.03	2.56	1.21	-.10
16	Race Ideology (39 items)	7.17	1.92	.10	7.31	1.66	.17	7.25	1.76	.14
17	Control Ideology (13 items)	0.86	0.80	.08	0.90	0.76	.11	0.88	0.77	.10
18	Personal Control (13 items)	2.17	0.94	-.03	1.98	0.92	.08	2.05	0.93	.03
19	System Modifiability (13 items)	2.42	0.94	-.14	2.25	0.98	.07	2.32	0.96	-.01
20	Race Ideology (13 items)	3.00	0.93	.16	3.12	0.91	.01	3.07	0.91	.07
21	Total Score (39 items)	19.47	4.21	.05	18.37	4.14	.33*	18.79	4.18	.21*
22	Total Score (13 items)	8.39	1.95	.02	8.20	2.10	.13	8.27	2.03	.09
23	High School Grades (HSGPA)	2.20	0.52	.11	2.02	0.44	-.08	2.09	0.49	.08
24	Summer School	0.25	0.44	.05	0.29	0.46	.10	0.28	0.45	.08
25	In State Residence	0.72	0.45	.07	0.83	0.38	-.13	0.79	0.41	-.03
26	Race of Teacher	0.53	0.51	-.38*	0.39	0.49	-.21	0.44	0.50	-.28*
27	Academic Objectives Met	0.56	0.50	.59*	0.48	0.50	.66*	0.51	0.50	.66*
28	SAT Verbal**	309.29	86.93	.56*	334.78	84.59	-.03	326.07	85.18	.17
29	SAT Math**	328.29	58.87	.16	342.81	52.13	-.33*	337.85	54.23	-.15
30	FGPA	1.49	0.62	1.00	1.57	0.62	1.00	1.54	0.62	1.00

* Significant beyond .05 level.
** Sample size due to incomplete data is 41 for Total, 25 for Female, and 16 for Male.

TABLE 2

Regression Equations, Multiple Correlations*
and Standard Errors of Estimate

ALL PREDICTORS (N=41)

									R**	S.E. of Estimate
		(27)		(2)		(29)		(28)		
2.1421	+	1.0428	-	.0442	-	.0053	+	.0029	.82	.42

ALL PREDICTORS EXCEPT SAT

									R**	S.E. of Estimate
Total Sample (N=95)										
		(27)		(9)						
1.8088	+	.8159	-	.0134					.69	.45
Females (N=36)										
		(27)		(18)		(15)		(2)		
1.5427	+	.8705	+	.2484	-	.2460	-	.0469	.81	.38
Males (N=59)										
		(27)		(11)		(21)				
.7054	+	.7269	-	.6307	+	.0293			.72	.44

* Variable numbers are given in parentheses above regression weights and are defined in Table 1 and Appendix.

** All R's significant beyond .05. A double cross validation on a random split of the Total Sample showed R's of .63 and .50. An application of the male equation to females resulted in an R of .60 and the female equation applied to males yielded an R of .59. Due to a small N the ALL PREDICTOR equation was not cross validated. Analyses were stepwise and terminated with an increase in R of .02 or less.

APPENDIX

Explanation of Variables in Table 1

1 Sex (1=Male, 2=Female)
2 Father's Occupation (see 3 below)
3 Mother's Occupation

Both 2 and 3 are scored as follows:

1. Professional - such as clergyman, dentist, doctor, engineer, lawyer, professor, scientist, teacher, etc.
2. Semiprofessional - such as accountant, actor, airplane pilot, armed forces officer, artist, draftsman, medical technician, writer, etc.
3. Manager-Proprietor-Executive - such as sales manager, factory supervisor, owner of small business, wholesaler, retailer, contractor, restaurant owner, manufacturer, officer in a large company, banker, government official, etc.
4. Salesman - such as life insurance, real estate, or industrial goods salesman, etc.
5. Clerical worker - such as sales clerk, office clerk, bookkeeper, ticket agent, etc.
6. Service or protective - such as armed forces enlisted man or noncommissioned officer, barber, beautician, bus driver, fireman, policeman, waiter, etc.
7. Skilled worker or foreman - such as baker, carpenter, electrician, mechanic, plumber, plasterer, tailor, foreman, etc.
8. Farm or ranch owner or manager
9. Housewife
10. Other

VPI INFREQUENCY

4 Raw score is as scored from form.
5 Maryland Standard Score (Mean=50, S.D.=10 based on local distribution by sex)
6 National Standard Score is percentile by sex from manual
7 Weighted score. Males receive a "1" if the raw score is $\geq$6.00 and females a "1" if the raw score is $\geq$7.00. Others receive a "0" code.

CPI COMMUNALITY

8 Raw score is as scored from form
9. Maryland Standard Score (Mean=50, S.D.=10 based on local distribution by sex
10 National Standard Score is percentile by sex from manual
11 Weighted score. Males receive a "1" if raw score is $\geq$24.00. Not scored for females.

12 Admissions Score is a weighted score used in experimental admission at the University of Maryland. Score is a composite of a variety of non-intellectual variables.

INTERNAL-EXTERNAL CONTROL (see Gurin *et al.*, 1969) High score is external control.

13 Control Ideology
14 Personal Control
15 System Modifiability
16 Race Ideology
17 Control Ideology
18 Personal Control
19 System Modifiability
20 Race Ideology
21 Total Score
22 Total Score

23 HSGPA (A=4.00, F=.00)
24 Summer School (Yes=1, No=0)
25 Instate Residence (Md=1, Other=0)
26 Race of Teacher in primary course in program (Black=1, Other=0)
27 Academic Objectives Met (1=completed all hours attempted, 0=some incompleted hours)
28 SAT-Verbal
29 SAT-Math
30 FGPA (1st semester freshman grades - A=4.00, F=.00)